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AUGUST 26.

The President, Dr. RUSCHENBERGER, in the chair.

Sixteen members present.

SEPTEMBER 2.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

SEPTEMBER 9.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-eight members present.

Mr. GENTRY communicated a notice of a great swarm of ephemerids which passed through the town of Lewisburg, on the Susquehanna River, on the afternoon of the 22d of August. The swarm was estimated to be about a mile in length by nearly a half mile in width, and was so dense as even to obscure passers-by on the opposite side of the street.

SEPTEMBER 15.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-seven members present.

The following papers were presented for publication: "On a new American species of *Glyptocephalus*." By Theo. Gill. "Description of fifty-two species of *Unionidæ*." By Isaac Lea.

The last-named paper was, on report of the committee, ordered to be published in the *Journal of the Academy*.

SEPTEMBER 23.

The President, Dr. RUSCHENBERGER, in the chair.

Twenty-five members present.

Exceptional Conditions in the Vegetation of Forest Seed.—Mr. THOMAS MEEHAN, in reference to the distribution of the *Coniferæ* of the Rocky Mountains, said, that in any forest it must have

struck observers that the trees were all pretty much of one age. Here we see a piece of forest in which the trees might be one hundred years old; there another perhaps fifty; and again young ones of from ten, twenty, and so on. They are, however, generally of one age, and though there are some younger trees of various ages scattered through, the great bulk of each forest started from the seed in the same season together. It was remarkable that of the immense amount of seeds annually produced by forest trees, how few of them grew. In the forests we found, as a rule, few seedlings, and though the boundaries of a piece of woodland might not be under cultivation, so as to destroy any vegetating seeds, the forest boundaries were seldom enlarged in any gradual way. In the woods about Philadelphia, the American white oak was not particularly abundant. Here and there were a few trees in almost every piece of wood; and though the trees bore acorns only every other year as a rule, yet in the bearing season they were more abundant than in most other species; yet young ones were so scarce that if the forests were cut away three years ago, the succession would not be remarkable for *Quercus alba*. But in 1872—the productive year for the acorns—there was something so favorable to their vegetation that seedlings now abound in these woods, and if the growing timber were now cut away, so as to give these seedlings a fair chance for life, the future forests of this part of Pennsylvania would be especially of white oak—as distinctly a white oak region as some parts of our country are famous for their pines. We see, however, from this that it is only at special times and under special circumstances, that seeds grow to any great extent in our comparatively favored forest region, and we can understand better the fact referred to, of forests generally having the mass of their timber trees about of one age.

Carrying these facts with us, we may understand some of the phenomena accompanying the forest distribution in the far west. Along the Rocky Mountain range, as well as in the Wahsatch and Uintas, the prevailing deciduous tree, or rather shrub (for it is scarcely a tree), is what has been supposed to be a variety of *Quercus alba* (var. *Gunnisonii*) by some, and by others a variety of *Q. Douglassii* (var. *neo-Mexicana*), but which I believe Mr. Watson has recently made a distinct species under the name of *Q. polymorpha*, an excellent name when the many varied forms are considered. It is unusual to find it growing in dense thickets. Generally it is in clumps of from five to twenty-five or more feet in diameter. Each clump has evidently started from one seed at some one time; and from one stem, underground suckers proceeding a few inches each season, have made the mass of stems as we see them. One could almost tell the age of the clump by the graded heights of the mass, the tallest of course being in the middle, and the outside often but a few inches, being the most recent growth. In this way the mass of varied characters becomes very striking.

If the parent plant be cut leaved, of course the whole is a cut-leaved clump. If entire leaved, we have an entire-leaved clump. If not of very vigorous growth, we have a clump of vegetation not more than two or three feet high; and then we have a mass of vigorous growers; one of the latter in Cheyenne Cañon, south of Pike's Peak, he saw with numerous little trees, perhaps thirty feet high, and stems two feet in circumference. There appeared nowhere, in his many hundred miles of travel, any young seedlings; indeed no plants anywhere that were probably less than twenty-five years old; and yet, in both of his visits to these regions, the plants were bearing acorns in the greatest abundance, and evidently bore in this way every year.

The coniferous trees of this region present the same appearances. Of some species young ones are rarely seen. This is especially true of *Pinus ponderosa*, which is perhaps more widely distributed through the Rocky Mountains than any other. The greater number of these trees are between one and two hundred years old. A stump of one of the largest cut down in Williams' Cañon, near Colorado Springs, had 216 concentric rings. Young broods of perhaps ten or twenty years old are occasionally seen, but not often. The young broods throughout the region between Gray's Peak and Pike's Peak are chiefly of *Pinus contorta*, or, as it ought perhaps to be more properly called, *Pinus Balfouriana*. Sometimes hundreds of acres of perhaps ten, twenty, or thirty years would be met with, but always of the same age in one district. Of course, where this species follows *Populus tremuloides*, as it often does when the poplar has been burned off, it is easy to understand how the pines may be all of one age; but the uniformity is the same whether the pines follow a burned district or not. *Abies grandis* affords the greatest irregularity in ages; but this, so far as his observations went, made no separate forests, but were mostly mixed with other species, chiefly with *Abies Douglassii*, *Abies Mensiesii*, or *Abies Engelmannii*. The general rule was evident everywhere, that only on special occasions, and these apparently often at long intervals, did a crop of young coniferous trees appear.

These facts being gained, we can understand at least some of the influences at work to prevent the spread of timber on the prairies from the trees growing along the river banks, or on to the low lands from the timbered regions on the heights. If under the most favorable conditions in the East, and on the cool slopes of mountains, it is but occasionally that the seeds find a conjunction of elements favorable to successful growth, how much more rare must these circumstances be on a dry, hot prairie? Seeds may fall for ages along the line of a river, and yet not a tree be found a hundred yards from the river line.

He thought, also, the facts would account for what is known as the timber line in the Rocky Mountains. This was not an arbitrary division, decided by mere altitude, as was popularly supposed;

but depended on the favorable or unfavorable circumstances under which seeds in certain seasons found themselves. The ascent of Gray's Peak by the way of the Clear Creek Cañon afforded an illustration. At the base of the mountain, we find *Pinus contorta*, *P. ponderosa*, *Abies Engelmannii*, and a few *Abies grandis*. As we advance all disappear except *Abies Engelmannii*, but *Pinus aristata* takes the place of the departed ones. Advancing higher, *P. aristata* disappears, and only *A. Engelmannii* is left for the last half mile before reaching the "timber line." The last series of trees appear about fifty years old, even to the boundary line, and then comes perhaps a half mile of *Juniperus alpina*, *Salix arctica*, and other small growing things. But on examining this mass of scrubby growth, a large quantity of *Abies Engelmannii*, not more than a couple of feet high, about twenty years of age, and seemingly never to be anything more than scrubs, is found growing with it. An examination of the forests at lower altitudes, however, shows that *Abies Engelmannii*, even at a thousand feet below, made its first twenty or thirty years in a similar scrubby condition. It was no uncommon thing to find specimens of this tree perhaps sixty feet or more in height, when clothed with branches to the ground, to have the early branches at the ground still remaining, and in just the same condition as those above the "timber line." The same thing occurs in American nurseries with some firs. *Picea pectinata* generally remains in this semi-stunted condition for ten or twenty years, losing its leader annually, spreading its side branches, but increasing its trunk at the ground, and its tap-root in length. After that it ascends rapidly, its leading shoot seldom being destroyed afterwards. He saw no reason, as Gray's Peak was not one of perpetual snow, except perhaps in some of the deepest ravines, why under favorable seasons for germination, *Abies Engelmannii* might not in time advance towards the top, without regard to any arbitrary "timber line."

The facts he offered were he thought worthy of attention by those interested in the geographical distribution of plants. Most forest trees seeded abundantly every year, and yet nature seemed to have placed some check on the ultimate perfection of her own great work. And indeed we could see the wisdom of this check; for if the seeds of these strong forest trees were to grow as readily as the seeds of the smaller annuals, the world, in the absence of man to cultivate, would have its smaller vegetation crowded out, and it would be one vast forest; and yet it seemed an enigma that nature should produce such an immense amount of seed with one hand, only to be destroyed by the other, unless we accept this principle, that seed growth is only occasional and exceptional to any great extent, and then we see how essential it is always to have a large and fresh stock constantly on hand, as a seedsman would say, so that advantage could be taken of the exceptional conditions when they occurred.

Malformed Red Clover.—Mr. THOMAS MEEHAN also presented some specimens of a malformed clover, *Trifolium pratense*, handed to him by a fellow member, Mr. Isaac Burk, with the request to bring it to the notice of the Academy if of interest.

The flowers, usually sessile, were in this case elevated on pedicels about an inch long, and from these, what should normally be the gynecium, was again developed into a short pedicel bearing a calyx, one of the segments of which, usually little more than a mere cilia, was developed into a complete leaflet. The case afforded no light on morphological law beyond what was already known; but the fact that the Red Clover grew in this way, had not, he believed, been recorded.

Mr. GENTRY made the following remarks regarding the nest of *Vireo solitarius*, Vieil.

Audubon, in describing the nest of *Vireo solitarius*, Vieil., affirms it "is prettily constructed and fixed in a partially pensile manner between two twigs of a low bush, on a branch running horizontally from the main stem, and formed externally of gray lichens, slightly put together, and lined with hair chiefly from the deer and raccoon." My experience has been quite different. Out of the many nests which I have seen and examined, I cannot recall a single specimen that will answer to the above description. I have five nests of this species, four of which are perfectly similar in structure; the remaining one formed of the culms of a species of *Aira*, constituting an exceptional case, and the only one that has ever fallen under my notice. They are all shallow, loose in texture, scarcely surviving the season for which they were designed, and placed between two twigs of a cedar or a maple tree at a considerable elevation from the ground, on a branch nearly horizontal to the main axis. They are built entirely of clusters of male flowers of *Quercus palustris*, which, having performed their allotted function, don their brownish hue at the very period when they can be utilized.

Here is evidently a change within a moderately short period, rendered necessary by external causes. This necessity may have grown out of inability to procure the favorite materials, or a desire for self-preservation. In the case of the species under consideration, it cannot be denied that the utter inability, without unnecessary physical effort, to procure the hair of the afore-mentioned animals, particularly in sections where *they* have been compelled to retreat before the advance of man, may have been one of the causes which have induced the change. I am satisfied, however, that it has not been the leading one, but that self-preservation has operated in this case for individual and family good. The adaptation of the colors of the female bird to the tints of surrounding objects, during the trying period of incubation, and the establishment of certain resemblances to familiar external objects are two of the ways in which it manifests itself.